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MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 3, 2017/2018

TWC3231 MOBILE AND WIRELESS COMMUNICATIONS

(All Sections / Groups)

5 JUNE 2018
9:00 AM – 11:00 AM
(2 Hours)

INSTRUCTIONS TO STUDENTS

1. This question paper consists of 4 pages including cover page.
2. Attempt **ALL** questions. All questions carry equal marks and the distribution of the marks for each question is given.
3. Write all your answers **CLEARLY** in the Answer Booklet provided.

Question 1

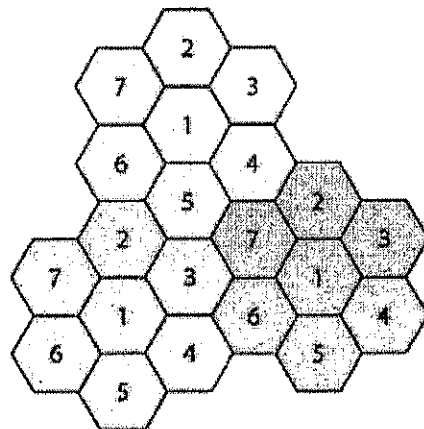
- A. Differentiate between mobility and wireless. (2 marks)
- B. Draw a suitable diagram to show a continuum of wireless standard that expand from personal area network (PAN) to wide area network (WAN). (4 marks)
- C. Briefly discuss the differences between first and second-generation systems. (4 marks)

Question 2

- A. A wireless network enables people to communicate and access applications and information without wires. This provides freedom of movement and the ability to extend applications to different parts of a building, city, or nearly anywhere in the world. In spite of freedom it also provides some challenges. Identify FIVE (5) challenges of working in wireless environment. (5 marks)
- B. A mobile ad hoc network (MANET) is generally defined as a network that has many free or autonomous nodes, often composed of mobile devices or other mobile pieces, that can arrange themselves in various ways and operate without strict top-down network administration. List any THREE (3) uses of MANET. (3 marks)
- C. A wireless personal area network (WPAN) is a type of personal network that uses wireless communication technologies to communicate and transfer data between the user's connected devices. Briefly describe TWO (2) standard related to WPAN. (2 marks)

Question 3

- A. Briefly discuss the principles of cellular frequency reuse. (2 marks)
- B. Identify and calculate frequency reuse factor for cell design below. Show the formula and calculation steps. (5 marks)



- C. List TWO (2) codes and user for a Global Position Satellite. (3 marks)

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Question 4

- A. Discuss FOUR (4) stages of evolution in e-business and m-business. (4 marks)
- B. Briefly explain mobile operating system and list TWO (2) latest example. (2 marks)
- C. Wireless attacks have become a very common security issue when it comes to networks. It is therefore very important to know of such attacks so that one is in a position to identify it in case it happens. As a junior network manager, list FOUR (4) known attack of WLAN.

(4 marks)

Question 5

Case Study: Based on <https://www.qualcomm.com/real-world-case-studies/3g-case-studies.pdf>

3G Case Studies – Maxis (Malaysia)

3G success is not limited to developed countries. In fact, 3G is proving to be an important technology in emerging markets, especially for improving broadband penetration in countries such as Malaysia and Indonesia. Maxis, the biggest operator in Malaysia, is one of the phenomenal 3G success stories in Southeast Asia.

Touted as one of the “Asian Tigers,” Malaysia has one of the strongest economies in the region, with a GDP of more than \$135 billion in USD. Malaysia’s mobile market, with a penetration rate of over 75%, is also one of the fastest growing in the region. But the total broadband penetration stands at a mere 15%.

Maxis, with a 41.5% share of the mobile market, covers over 92% of the country. It launched WCDMA services in July 2005, and introduced HSDPA in September 2006. 3G has equipped Maxis with an efficient and high-performance platform to launch a number of data-centric applications, such as video on demand, full-track music downloads and video telephony. It offers a range of 3G-enabled devices including PC data cards and USB terminals targeting the enterprise market. As of April 2008, Maxis reported 1.3 million active 3G users, an impressive three-fold year-over year increase.

But what is remarkable about Maxis is its strategy to use 3G to provide fixed and nomadic broadband access as an alternative to ADSL and other wireline broadband services. This HSDPA-based service targets the residential broadband market, and has been a phenomenal success. With Malaysia’s broadband penetration teetering at only 15%, there is also a significant growth potential.

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Maxis offers a specialized modem that has both data connectivity through USB/RJ45 and voice connectivity through a RJ11 socket. The modem also has a backup battery, providing both portability and uninterrupted service during power outages. The service is priced to compete with ADSL and other wireline broadband services, and Maxis has worked with its vendors to keep the modem cost low. Thus, Maxis can offer consumers a complete wireless package that is more attractive than any alternative. This service offers a compelling value proposition: data speeds similar to DSL; portability unparalleled by DSL; converged service with both voice and data connectivity; and a single, cost-effective bundled price. For Maxis, this service has opened new revenue streams and is accelerating the return on 3G investments.

Maxis plans to keep up the momentum by expanding the 3G network to cover up to 80% of the country's prime economic areas. Maxis is targeting a market share of 25-30% of the country's total broadband market in the next five years.

Maxis is also exploring mobile TV options. It has publicly announced trials of both MediaFLO™ and DVB-H technologies.

The key takeaway from Maxis' roaring success is this: to ensure the economic viability of investments in 3G, operators should target both mobile and fixed use, especially in countries where the wireline broadband penetration is minimal. Maxis has demonstrated a compelling model for 3G's success in emerging markets.

Questions

- A. How big is Maxis market share, coverage and active users in 3G market? (3 marks)
- B. Identify TWO (2) mobile technology used in Maxis. (2 marks)
- C. What is Maxis strategy and what are services they competing for? (3 marks)
- D. Summarize the Maxis key success factor. (2 marks)

End of Paper